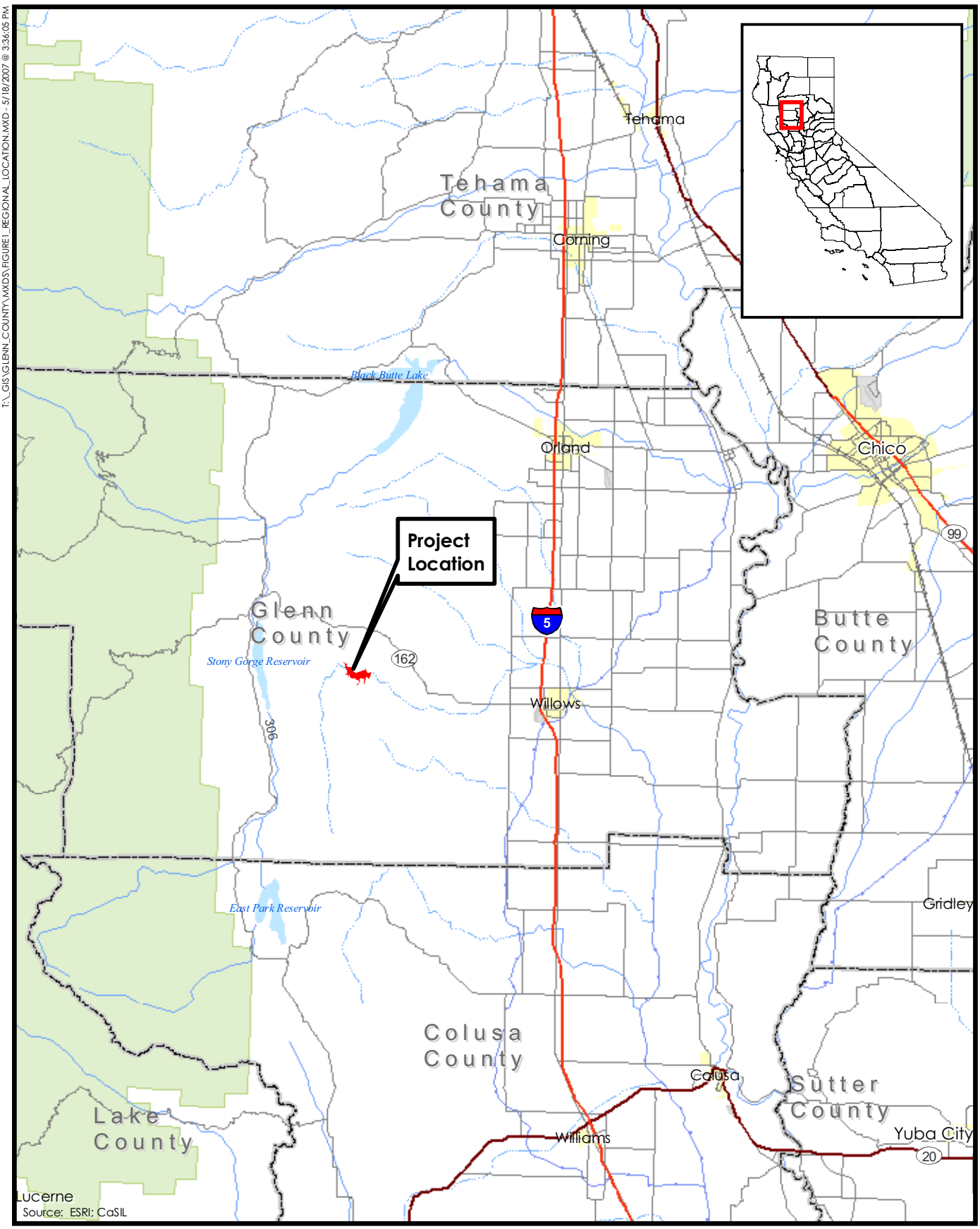

Figure 1
Regional Location Map
South Fork Willow Creek Detention Basin Project

PMC

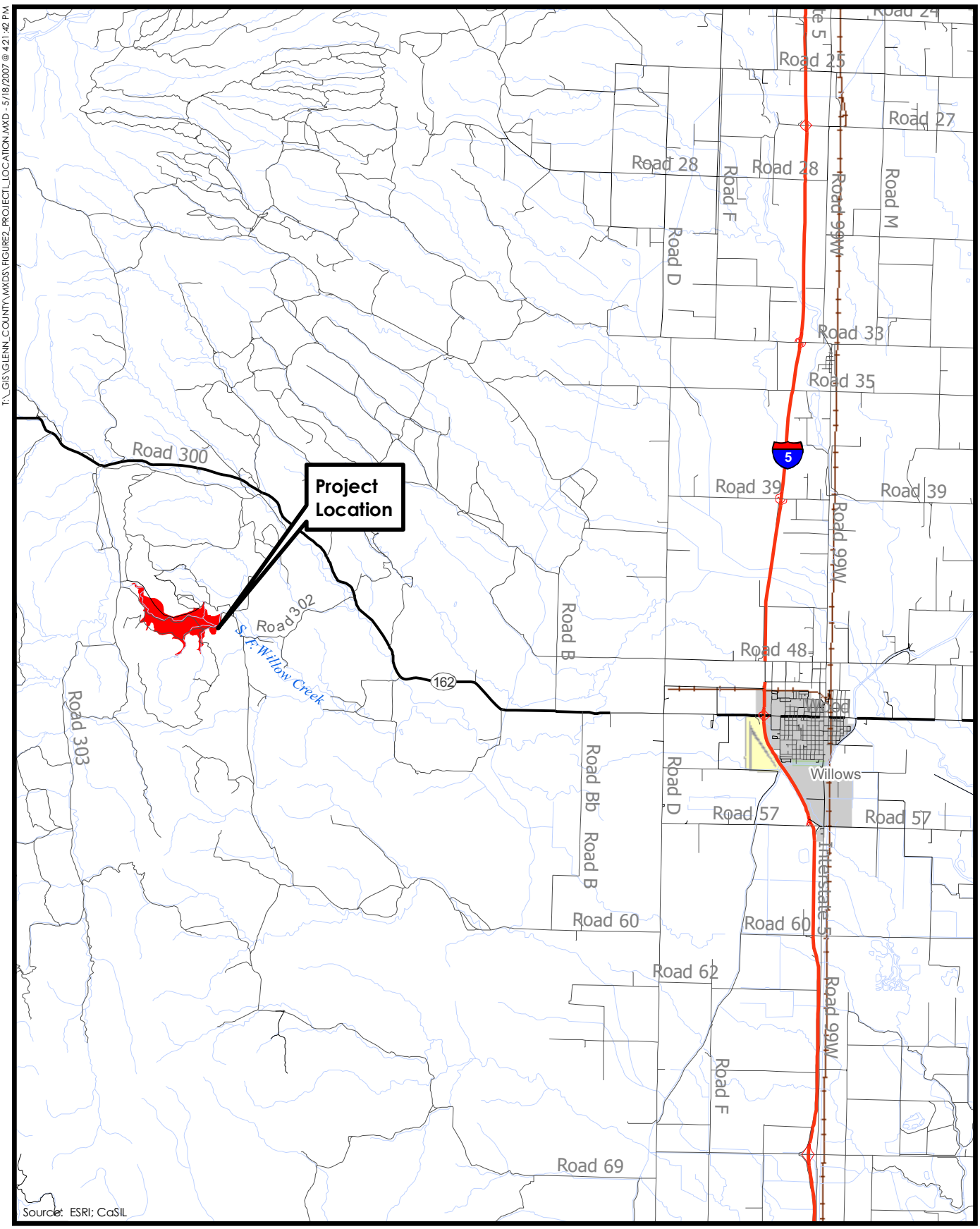

Figure 2
Project Location Map
South Fork Willow Creek Detention Basin Project

PMC

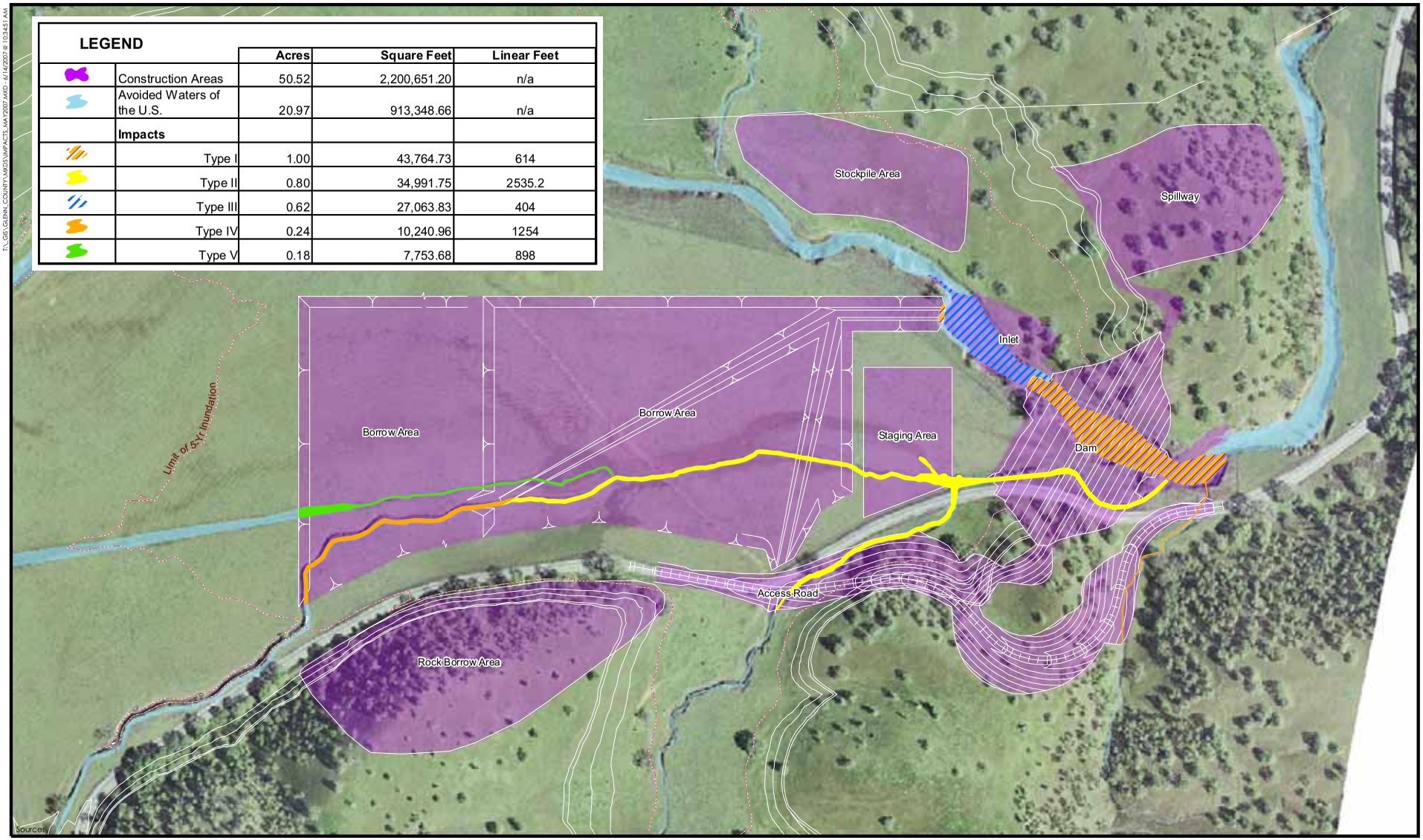

Figure 4
Impact Assessment to Waters of the U.S.
South Fork Willow Creek Detention Basin Project
PMC

Table: Alternatives Summary for the Colusa Basin Drainage District Integrated Watershed Management Plan (CH2MHILL 2004)

Measure	Assumptions	Percent Peak Flow Reduction Relative to Existing Conditions		Cost ($/million)
		100-year	5-year	
South Fork Willow Creek Detention Basin	The South Fork Willow Creek detention basin would be constructed with a 90-foot-high embankment for a maximum of 7,900 acre-feet of water storage.	14	11	11.6
Wilson Creek Detention Basin	The Wilson Creek detention basin would be constructed with an embankment height of 55 feet and would provide for maximum water storage of 2,300 acre-feet.	7	6	10.7
Rice Field Spreading Basins	An additional 3 feet of flood storage would be developed on 1,500 acres of rice fields for a total of 4,500 acre-feet of storage, located primarily in the Wilson Creek Sub-basin watershed. Ten spreading basins, 2,500 feet per side, with 4-foot-high berms would be constructed.	11	1	8.5
Stream Restoration	**Upper Watershed Portion** Fifty percent of the stream reaches downstream of the proposed detention basins on South Fork Willow, North Fork Willow, and Wilson Creeks and upstream of the Tehama-Colusa Canal would be restored through construction of biodegradable bank stabilization and riparian buffer strips. Gradient control structures would be installed at intervals along the channel of South Fork Willow Creek.	5	2	12.8
Stream Restoration	**Valley Portion** Within Wilson Creek, 55,000 linear feet of stream would be restored by adding 20 feet to the bottom width of the stream. Within Willow Creek, 38,000 linear feet of stream would be restored by adding 20 feet to the bottom width. This measure also assumes replacing 21 bridges along these two streams and providing vegetation maintenance along one bank of each stream.	4	4	25.5

Measure	Assumptions	Percent Peak Flow Reduction Relative to Existing Conditions		Cost ($/million)
		100-year	5-year	
Ring Levee	A 2-mile-long ring levee that extends approximately from the GCID Canal to Pacific Avenue would be constructed. The levee would have an 8-foot-high embankment with 2:1 side slopes and a 12-foot-long gravel service road.	0 (protect northeast portion of City of Willows)	0 (protect northeast portion of City of Willows)	1.9
Structural Alternative Total[a]	**N/A**	**33**	**21**	**71.0**
Rangeland Management	Fifty percent of the rangeland rated as poor hydrologic condition in the Upper Watershed would be improved from a poor to a fair hydrologic condition by seeding annuals or native perennials over 40,000 acres of rangeland.	3	6	Low: 4.0 High: 20.0
Reforestation	Fifty percent of the woodland rated as poor hydrologic condition in the Study Area would be improved from a poor to a fair hydrologic condition by planting oak trees over 4,600 acres of woodland and consequently increasing the canopy cover.	1	2	Low: 16.0 High: 50.0
Floodplain Management	Floodplain management is considered actions that could be taken to accommodate future flood events so as to decrease damages without reducing peak flows or overall inundated area (e.g., flood-proofing of individual structures, negotiating flood easement areas, and future restrictions on development within particularly flood-prone areas). No specific assumptions were made as to what approach would be most feasible.	Avoid damage	Avoid damage	N/A
Nonstructural Alternative Total[a]	**N/A**	**4**	**7**	**Low: 20.0 High: 70.0**
Combined Alternative: All Structural and Nonstructural Measures	**Low and high estimates are derived from variations in implementation of nonstructural measures.**	**37**	**26**	**Low: 91.0 High: 140.0**

Attachment A: Additional Information for ENG Form 4345

CLEAN WATER ACT SECTION 404 PERMIT APPLICATION PACKAGE
SOUTH FORK WILLOW CREEK DETENTION BASIN PROJECT, WILLOWS, CA

CONTENTS:

BLOCK 18 – NATURE OF ACTIVITY

The Colusa Basin Drainage District (District) was formed by the State Legislature in 1987, after local residents recognized the need to address flooding and winter drainage, irrigation drainage, and subsidence problems within the Colusa Basin (or Basin). During the flood season (October 15 through April 15), rainfall-induced flooding frequently occurs along the Colusa Basin Drain (or Drain) and its tributaries. The primary cause of flooding is inadequate conveyance capacities in the Drain and the ephemeral streams.

The District commissioned a series of studies and investigations beginning in 1991 to assess potential methods to reduce the potential for flood damage while improving watershed health where feasible. These studies have documented numerous potential measures for addressing the flooding problems in the Basin and laid the foundation for the development of the *Colusa Basin Drainage District Integrated Watershed Management Plan Alternatives Report* (CH2M HILL, 2002), which resulted in a calibrated hydrologic model that allows estimation of flood control benefits of the various identified alternatives.

A hydraulic investigation was conducted as part of the District's Proposed Project alternative development and refinement process. The focus of Integrated Watershed Management Plan (Plan) was to investigate alternative methods of reducing flooding while increasing ecological value within the South Fork Willow Creek and Wilson Creek Sub-basins in Glenn County (or County), and to ultimately select a preferred course of action to accomplish these two primary objectives. Potential impacts and mitigation measures associated with the implementation of the alternatives were developed in the Plan (CH2M HILL, 2002).

The Final Integrated Watershed Management Plan (Plan) was completed in 2003 for the District and an Environmental Impact Report was developed and approved by the District the same year (CH2M HILL, 2003a, b). The Plan identified several practicable alternatives to reduce flooding in the Willows, California area. The project that was identified as the least environmentally damaging alternative and the most practicable based on minimizing flooding in the Willows area, engineering, and costs is the construction of a flood control detention basin on South Fork Willow Creek.

The South Fork Willow Creek Detention Basin site is located 13 miles west of Willows, south of Highway 162 along County Road 302 **(Figures 1, 2)**. The creek originates in the North Coast Range foothills west of Willows and travels east toward the Sacramento River, crossing Interstate 5 about 1 mile north of Willows. This creek has a history of flooding, resulting in damage and the loss of access to homes along it course and in the Willows area.

The proposed dam embankment would be approximately 80 feet high, including 9 feet of freeboard above the 1000-year water surface elevation. The embankment cross section ranges from approximately 350 to 600 feet wide at the bottom, and 25 feet wide at the top. The total length of the embankment would be roughly 700 feet. If empty, the detention basin would store a peak inflow of 7,900 acre feet (ac-ft), the theoretical volume of the 1,000-year return interval flood event (CH2M HILL, 2007).

The ungated outlet will reduce the flow downstream of the detention dam to approximately 370 cubic feet per second (cfs). The outlet system is capable of releasing half of the reservoir volume in 7 days and will not retain water longer than 30 days. A spillway will allow discharge of flows greater than those associated with a 1,000-year event into the creek downstream of the dam (CH2M HILL, 2007).

Construction Sequence

Two construction seasons (April though October) have been scheduled from start to completion of the project. The first year (2008) will include the excavation work within the dam footprint, the outlet works, groundwater and surface water control systems, and the new access road. The second year (2009) will include placement of all fill materials, excavation of the spillway, and completion of the dam. The actual construction sequence may vary depending on the construction start date, the contractor, the subsurface conditions, mitigation requirements and the weather.

First Construction Season (2008)

The reservoir area where the core material will be obtained should be stripped of the grasses and thin root system. This material may be stockpiled for placement in the spillway area. The footprint of the dam will be stripped of all organic material. Trees and tree roots will be removed. The soil in the dam footprint will be excavated and stockpiled on top of the borrow area upstream of the dam. Water will be added to this soil to maintain optimum or above optimum moisture content. Gravelly soil will be stockpiled separately from the clay. The bedrock in the valley bottom will be exposed to allow evaluation by the design engineers. The dam footprint in the core zone in the valley bottom will be carefully cleaned to begin removal of all loose material deemed unacceptable.

The outlet pipe excavation will be made after groundwater and surface water controls have been put in place. The sites for the inlet and outlets to the outlet pipe system will be excavated and the concrete work completed. No water from the creek will likely go through the outlet pipe during construction as its elevation will be slightly higher than the creek bottom and there is a low level of water in the creek between April and October. The relief wells may be installed during the first season utilizing a heavy truck-mounted drill. The tops of the holes or completed wells will have to be protected from inundation of the creek during the following winter. The trees, roots, stumps, and soil on the abutments will be removed. Any detailed localized cleaning should be postponed until the second year of construction.

The realignment of County Road 302 and the dam access road on the right abutment may be completed in the first year or the second year.

Second Year of Construction (2009)

The second year of construction (2009) will include the dam and spillway. The access road on the right abutment will be finished to allow for construction traffic. County Road 302 will be removed down to bedrock. The dewatering system will be restarted and renovated to produce a footprint free of flowing and ponded water. The creek flow will be pumped or forced into the outlet pipe or an extension of the outlet pipe upstream with a small cofferdam. The abutments and core foundation will be cleaned of any localized soil, roots, or loose rock. Within the core zone, dental concrete will be applied where the rock is too rough to allow compaction of the core material against the rock. Embankment material will be placed across the full width of the dam footprint. The blanket drain will be placed and compacted. The toe drain will be installed.

The rock borrow area in the spillway will be developed as the spillway is excavated. This material will be processed either in the spillway or in the valley bottom to produce the upstream and downstream shell materials. Once the blanket drain is complete, the materials will be placed over the blanket across the entire width of the dam. Should the spillway not yield sufficient material, the rock borrow area in the reservoir adjacent to County Road 302 will be cleared and excavated.

Material from the core will come from the stockpiled material upstream from the dam and from the underlying native undisturbed material. This excavation will also create the sediment storage area upstream of the dam. Some additional excavation and accompanying dewatering may be required to create the pool areas for sediment storage. Topsoil strippings from the previous year clearing may be spread on the floor of the spillway. The concrete weir and cutoff in the spillway will be completed. All surface soil exposed within the reservoir and access road cut and fill slopes will be seeded. The dewatering system just outside the dam footprint may be shut down once the seeding is completed and approval is obtained from California Department of Water Resources Division of Safety of Dams (DSOD) to put the project into operation.

The following is a detailed description of the construction process, project operation, and the anticipated maintenance that will be associated with the operational project:

Construction Process

Ground and Surface Water Control

Dewatering will be required within the footprint of the dam to allow excavation and removal of materials into the bedrock and to allow preparation of the core foundation. The groundwater level is anticipated to be from 4 to 15 feet bgs during the spring and summer months of the year outside the creek area. When the excavation in the valley bottom within the dam footprint encounters groundwater, a french drain should be installed down to the bedrock in the valley bottom upstream of the upstream toe of the dam footprint. A series of vertical sump pipes should be installed in the french drain with automatic pumps operated to pump the groundwater down to the top of the bedrock at the upstream edge of the dam

footprint. This water should be pumped to a point downstream of the dam where it is discharged. Sediment control will be required to prevent discharge of fine sediments to the creek. As the excavation is completed, some localized dewatering sumps may be required in the area of the core foundation, outlet pipe excavation, and County Road 302.

The dewatering system must be operated until the excavation within the footprint is complete and the core zone foundation cleaning is finalized. The dewatering system may be turned off after the first construction season to allow all water to pass through the dam site. Alternatively, the creek may be channelized and prevented from dropping sediment into previously cleaned areas.

At the start of the second season, the dewatering system will utilize the outlet works to enable installation of a pipe across the dam site. Water must be discharged far enough downstream to prevent impacts to the dam footprint. A small cofferdam could be used upstream of the dam to collect the creek flow, and the french drain system could be used to collect groundwater.

Surface runoff from rainstorms will have to be collected and added to the piping system in the outlet works. This water will come from the abutments and all drainages upstream of the dam. Dewatering must continue until the entire dam and sediment basin are completed. Sumps will also be required to complete the excavation in the sediment storage area upstream of the dam.

Dam Foundation Preparation

In the valley bottom, the existing soil within the dam footprint should be removed down to bedrock. Within the core zone of the dam, the exposed bedrock should be cleaned with an air hose or vacuum equipment. Loose pieces of bedrock that have been displaced from their original location should be removed. The exposed rock may have to be locally covered with dental concrete to flatten sharp slopes. The dental concrete should be protected from damage until the core material is placed.

Earthwork

The grass and root system in the soil borrow area immediately upstream of the dam is approximately 3 to 6 inches thick. This layer should be removed and stockpiled for use on the downstream face of the dam after the embankment is complete.

Soil Borrow Area

The materials excavated within the dam footprint will be stockpiled by material type upstream of the dam. This is important as the lean clay material needs to be placed back into the core zone, and the sandy or gravelly zones will go into the downstream shell above the blanket drain.

Moisture conditioning of the core material will be required as the high summer temperatures and handling will cause significant drying. Moisture content in the borrow area should be maintained within about 3 to 5 percent of optimum moisture content to ensure that the material is within 0 to 5 percent of moisture content when it is compacted. The depth of excavation in the borrow area is expected to be on the order of 6 feet to prevent equipment from getting stuck in the soft soil near the groundwater. If excavation is needed

to bedrock, then an excavator may be used. Upon completion of the borrow area excavation, the side slopes should be made at a slope that allows revegetation and passage by cattle and wild animals.

Rock Borrow Area

The spillway excavation is the primary source of rock for the shell zones of the dam. The shallow rock to 10 feet is anticipated to be rippable. Below 10 feet, light blasting may be required. Because of the sensitive permeability of the rock fractures, blasting may not be good for the overall permeability of the dam. Supplemental rock can be quarried from the rock borrow area upstream of the dam.

Earth Fill Dam Construction

The blanket drain, which includes the intake and outlet pipe, will have to be placed on cleaned foundation bedrock. Any vertical surfaces will have to be sloped 1:1 or flatter using shotcrete placed against cleaned, undisturbed foundation material. Once the blanket drain is in place, the first layer of overlying fill will have to be pushed out over the sand in a 1.5-foot lift and compacted. Heavy equipment on the core and shell zone can then be used without damage to the blanket drain.

Spillway

The cut for the spillway will be difficult to make at a specific slope because of the blocky layered rock. It could be excavated vertically and then blasted with inclined shot holes to create a final slope.

Operations

Outlet Operation

The outlet for South Fork Willow Creek Detention Dam is designed to operate with only periodic inspection and no daily operations. The detention dam will have an ungated outlet with a capacity of approximately 370 cfs. During most of the year, the natural flows on South Fork Willow Creek will flow through the ungated outlet pipe unimpeded. During infrequent storms, the inflow will exceed the outlet capacity, and the reservoir will begin to fill. The outlet flow will increase as the reservoir pool elevation increases. The outlet capacity will gradually increase to a maximum of approximately 370 cfs, which is well below the estimated 1,400 cfs capacity of the South Fork of Willow Creek.
If, in the future, the dam/reservoir is converted to a storage reservoir by installing outlet gates, then operation/control of the outlet gates will be required (which is outside the scope of this project).

Spillway Operation

The spillway for South Fork Willow Creek Detention Dam is designed to not require daily operation. The spillway entrance sill does not include gated structures to control discharge. During the probable maximum flood (PMF), the sill will operate at different performance stages of a partially submerged broad-crested weir. Downstream of the sill, the chute/

channel will flow at velocities of about 15 feet per second (fps).

Maintenance

The maintenance of the project includes the intake, outlet pipe, stilling basin, spillway, dam embankment, and access road. Because the operation of the detention facility is for flood control and not storage, the larger winter storm runoff will be stored behind the dam and automatically discharged from the outlet at a slow rate. The maximum discharge rate from the detention dam will be approximately 370 cfs into South Fork Willow Creek.

Intake

This structure consists of a concrete intake, with side openings and an open top. These openings are covered with trash racks. (Note: the head wall is fitted with a wall thimble for the future installation of a sluice gate if the reservoir is converted to a storage reservoir.) During the wet period (October through April), the reservoir may temporarily store some water when the inflow exceeds the capacity of outlet structure. During the dry period (May through September), when the natural runoff from the drainage basin is less than the capacity of the ungated outlet, the detention dam impoundment will drain below the intake elevation. The remaining dead pool elevation is approximately elevation 424 feet. The small pool will evaporate or drain away over the several dry months (May through September), leaving a dry reservoir to start the next rainfall season.

Outlet Pipe

When the intake facility is accessible during the summer months, the pipe and inlet should be inspected, the intake trash rack will be cleaned, and sediment should be removed from the inlet structure. Any large debris or sediment that has collected in the pipe should be removed. The air vent should be inspected. The intake trash rack and chamber must be in clean operating condition to maintain the required capacity.

Stilling Basin

The discharge facility near the downstream toe of the dam (impact type of stilling basin) should also be inspected and cleaned of silt, sediment, and any debris. Because the intake facility is several feet above the invert of the upstream creek, no significant material is anticipated to accumulate in the downstream impact facility. However, vandalism may include placing rocks into the impact basin, which can lead to severe erosion of the concrete.

Spillway

The spillway will consist of an excavated channel across the left abutment and discharge into the South Fork Willow Creek. The entrance to the spillway will be excavated to provide a relatively smooth shape to guide the water to the concrete sill across the entrance. The concrete sill includes a rounded crest and a gradual downstream slope (concrete) to match the start of the rock excavation. Downstream of the sill, a long rock-cut chute transitions from the 300-foot-wide entrance to a 200-foot-wide chute. The transition and chute will be rock-cut without engineered protection.

Because the spillway will only be used on extremely rare occasions (during storms greater than the 1,000-year event), it is likely that vegetation will grow within the chute. For proper

operation, the spillway should be cleared of vegetation periodically. The frequency of cleaning is unknown at this time, but most likely on the order of every 5 years. Annual inspection of the spillway (entrance and chute) should be conducted to determine the need for clearing. Any vegetation located near the sill should be removed. In other locations, once the vegetation reaches more than approximately 1 foot in height, the spillway should be cleared.

When the spillway operates, significant erosion is expected to occur. It is anticipated that maintenance and repair will be necessary after virtually all events that discharge through the spillway. Because frequency of spillway operation (and thus maintenance) is expected to be on an average of a 1,000-year event, no prediction can presently be made of the extent of damage or cost to repair.

Dam Embankment

The embankment will be built with a camber to provide for some settlement as the dam ages. The settlement monuments on the dam crest should be surveyed for deformation, initially on an annual basis, and less frequently as the performance of the dam is understood. The embankment should be inspected annually (and after any major storm) for erosion/damage by runoff or waves. Piezometers will be installed and should be read frequently during the initial years of operation, and especially if the dam is converted to a storage dam.

Measurement v-notch weirs will be installed at the toe of the dam, and at the ends of the underdrain pipes on both abutments. The staff gages at these weirs need to be read frequently to develop an understanding of the seepage and performance of the dam. The dam embankment should be inspected for signs of seepage that could result in failure. The extent of allowable seepage and determination of such should be included in the operations and maintenance (O&M) manual for the facility.

Access Road

The access road to the dam crest should be inspected annually. Drainage ditches and culverts should be cleaned and facilities repaired as needed. Rutting and erosion of the road should be repaired by regrading and importing appropriate road-base material consistent with the design specifications. The access road must be maintained for normal vehicular traffic for embankment inspection and spillway inspection and/or repair. The access must be suitable for pickup trucks and maintenance equipment such as backhoes, graders, and dump trucks.

The intake facility and outlet stilling basin will each have access roads that will need to be maintained. Any road access to the intake facility will likely be underwater annually and, therefore, it may be possible during these periods to only utilize non-vehicular access. Depending on the first few years of operation, the intake facility access will be re-evaluated for a vehicle access.

BLOCK 19 – PROJECT PURPOSE

The purpose of the project is to reduce future flood-related damages in the City of Willows and surrounding agricultural land in Glenn County from flood events comparable to those experienced in 1995 and 1998. Flooding is a significant problem in the project area. For example, approximately 28,081 acres were flooded during an 86 year flood event in 1998. Estimates of annual flood damages in Glenn County are $858,000; however, during large flooding events, damages can be significant. In 1995, an estimated $14,968,000 in damages occurred in Glenn County due to flooding, while damages in 1998 were estimated to be $65,140,000.

Of several project alternatives that were evaluated, the South Fork Willow Creek Detention Basin (Proposed Project) was the most practicable, least environmentally damaging alternative of the Integrated Watershed Management Plan (Plan) developed by the Colusa Basin Drainage District (District). Of all the practicable alternatives, the Project will minimize impacts to downstream flooding in and around the town of Willows, bank erosion, deposition of sediments, agricultural production, riparian and wetland habitats, habitat for rare and endangered species, and it will achieve these goals with a lower cost and greater engineering feasibility than any of the other alternatives. The Project seeks to preserve and enhance agricultural production as well as provide flood and drainage water protection. The project also uses Integrated Resource Management to bring together representatives from diverse groups to identify, discuss and resolve issues in a way that mutually benefits parties.

Implementation of the Project is anticipated to reduce peak flow in the combined Willow Creek and Wilson Creek channels (in the City of Willows area) by approximately 14 percent for a 100-year storm event and 11 percent for a 5 year storm event. Modeling suggests a corresponding reduction in the flooded area (in the vicinity of the City of Willows) of as much as 25 percent for the 100 year storm event and 47 percent for a 5 year event. The detention of sediment in the basin translates into the direct benefit of lower sediment yields downstream, reducing he downstream turbidity, channel deposition, and other sediment related problems.

The Project includes facilities and measures that will, over time and in conjunction with an ongoing conservation program with the Natural Resources Conservation Service and the Glenn County Resource Conservation district, substantially reduce flooding in areas included within the scope of the project. Additionally, selected measures will be implemented in the context of an overall adaptive management framework to promote the ecosystem restoration goals of CALFED, while ensuring landowner and agency acceptance.

BLOCK 20 – REASON(S) FOR DISCHARGE

The extent of filled jurisdictional "waters of the U.S.," including wetlands was determined by overlaying the 60 Percent Design Drawings (CH2M Hill, 2007) over the U.S. Army Corps. of Engineers (ACOE) verified wetland delineation map (*Delineation of Waters of the United States Including Wetlands, South Fork Willow Creek Detention Basin*) (PMC, 2007) as shown in Figure 4 in the Section 404 Clean Water Act permit application. Acreage calculations for each type of jurisdictional waters and type of impact are summarized in the table for Block 22 in this Attachment.

Implementation of the proposed project will result in the excavation, dewatering, re-channelization, and fill of federally protected "waters of the U.S.," including wetlands as defined by Section 404 of the Clean Water Act. Impacts to South Fork Willow Creek will occur as a result of the construction of the dam embankment and outlet structure **(Type #1 Impacts, Figure 4)** and from the development of the intake structure and stilling basin **(Type #2 Impacts, Figure 4)**. Seasonal wetlands will be impacted by excavation of soil from the borrow sites as well **(Type #3 Impacts, Figure 4)**. Ephemeral drainages south of South Fork Willow Creek will be impacted in two ways. First, soil from the borrow areas will be excavated and removed for use in the construction of the dam embankment and access road, which will have a direct impact on the ephemeral drainage in the borrow areas **(Type #4 Impacts, Figure 4)**. Second, some of the drainages will be dewatered due to the re-channelization of drainages **(Type #5 Impacts, Figure 4)**.

Block 18 above describes in detail the reasons for discharge to each jurisdictional "waters of the U.S.," including wetlands highlighted in **Figure 4**. Acreages of these discharges and compensatory mitigation measures are detailed in Blocks 21 and 22 below.

BLOCK 21 – TYPE(S) OF MATERIAL BEING DISCHARGED & THE AMOUNT OF EACH TYPE IN CUBIC YARDS

Approximately 1.00 acre of South Fork Willow Creek will be used for the detention basin embankment **(Type #1 Impact See Figure 4 and Block 20).** Approximately 12,906 cubic yards of native soil from the borrow area and rock, concrete, and rip rap will be used to construct the dam embankment. The inlet/outlet pipe will be encased in concrete and the stilling basin will be constructed of concrete and rip-rap.

In addition to the above noted impacts from the construction of the detention basin embankment, this project will also result in 1.84 acres of additional impacts to jurisdictional "waters of the U.S.," including wetlands due to dewatering and rechannelizing of ephemeral drainages, excavation of the South Fork Willow Creek bed to lay to inlet and outlet, and borrow of native material from a seasonal wetland. Approximately 0.42 acres of these jurisdictional features will be impacted by the removal of borrow material in the two borrow areas. Another 0.80 acres will be impacted by dewatering of channels as a result of the creation of the borrow pit; however, these channels will be rechannelized to empty behind the detention basin embankment. A portion of South Fork Willow Creek will be excavated, creating an additional 0.62 acres of impact to "waters of the U.S.," including wetlands (**Table 2**).

TABLE 1: ESTIMATE OF IMPACT (TYPE #1) FOR WETLAND FEATURES OF SOUTH FORK WILLOW CREEK DETENTION BASIN PROJECT

WETLAND TYPE*	A. AREA (ACRES)	B. AREA (SQUARE FEET)	C. OHWM DEPTH (FEET)	D. CUBIC FEET (B X C)	E. CUBIC YARDS (D/27CF)
SOUTH FORK WILLOW CREEK	1.0 Acres (614 linear feet)	43560 sf	8' (est)	348,840 cf	12,906 cy

TABLE 2: ESTIMATE OF OTHER IMPACTS FOR WETLAND FEATURES OF SOUTH FORK WILLOW CREEK DETENTION BASIN PROJECT

WETLAND TYPE	IMPACT TYPE (ACRES)	ACRES	SQUARE FEET	LINEAR FEET
SOUTH FORK WILLOW CREEK	Type #2 Excavation Creek	0.62	27064	404
DRAINAGE	Type #5 Dewatered, Rechannelized	0.80	34992	2535
DRAINAGE	Type #4 Excavation	0.24	10241	1254
SEASONAL WETLAND	Type #3 Excavation	0.18	7754	898
TOTAL		1.84	80051	5091

** Delineation of Waters of the United States Including Wetlands, South Fork Willow Creek Detention Basin Project*, PMC, March 2007.

BLOCK 22 – SURFACE AREA IN ACRES OF WETLANDS OR OTHER WATERS FILLED

TABLE 2: ESTIMATE OF OTHER IMPACTS FOR WETLAND FEATURES OF SOUTH FORK WILLOW CREEK DETENTION BASIN PROJECT			
WETLAND FEATURE -IMPACT TYPE*	**ACREAGE**	**EQUIPMENT**	**PROPOSED MITIGATION /FEES**
SOUTH FORK WILLOW CREEK – FILL	1.00 acres	Trucks, loader, dozer, backhoe, grader, roller	In lieu fees
SOUTH FORK WILLOW CREEK-EXCAVATION	0.80 acres	See above	In lieu fees and on-site creation of undetermined amount of ephemeral drainage
DRAINAGE-DEWATERED AND RECHANNELIZED	0.62 acres	See above	In lieu fees
DRAINAGE – EXCAVATED	0.24 acres	See above	In lieu fees
SEASONAL WETLAND	0.18 acres	See above	In lieu fees
TOTALS	2.84 acres	Trucks, loader, dozer, backhoe, grader, roller	On-site creation and In lieu fees

** Delineation of Waters of the United States Including Wetlands, South Fork Willow Creek Detention Basin Project*, PMC, March 2007.

Mitigation due to the project's impacts to "waters of the U.S.," including wetlands (South Fork Willow Creek, seasonal wetlands, and ephemeral drainages) would be achieved by the following measures:

1. Onsite re-channeling of drainages within the borrow areas (approximately 1.9 acres of drainage channels will be created within the borrow areas);

2. Installing intake and outlet structures within the South Fork Willow Creek bed to continue flow of water within the creek channel in order to keep constant flow of water passing through creek;

3. Creation of a wider stream in the inlet area of the detention basin;

4. Enhancement of the seasonal wetland in the borrow areas through increased inundation in the borrow and staging areas during flood events; and

5. The purchase of in-lieu fees from the ACOE.

Temporary and indirect affects of the project to "waters of the U.S.," including wetlands will occur during flood events. As water backs up behind the dam embankment within the detention basin, water will temporarily fill the South Fork Willow Creek, ephemeral drainages, and seasonal wetlands. However, since the water will begin to recede after each flood event until the detention basin is empty of water, there will be no impact to the function and value of these features during the operation of the Project. Since the South Fork Willow Creek does not contain riparian wetland habitat, the operation of the Project will only temporarily fill the creek with water and will not impact any wetlands within the creek. Within the detention basin, there are seasonal wetlands and ephemeral drainages that will also be temporarily filled with water.

Ephemeral drainages will help drain the detention basin after each storm event and there will be no impact to the function of these drainages during operation of the Project. The two seasonal wetlands within the detention basin will be inundated with water during each flood event; however, the inundation of these features and adjacent uplands will only increase the function and value of these wetlands. The presence of additional water after storm events will create both a larger area of seasonal wetlands and increase the value and function of existing wetlands during the operation of the project (Mitigation Measure #4 outlined above). Therefore, temporary impacts of the operation of the Project will be limited to increased water within the South Fork Willow Creek and associated ephemeral drainages, but these will recede after storm events, leaving the function and value of these features intact.

BLOCK 24 – ADDRESSES OF ADJOINING PROPERTY OWNERS, LESSEES, ETC. WHOSE PROPERTY ADJOINS THE WATERBODY

APN	ADDRESS	OWNER	OWNER ADDRESS
021-100-05		G. Horowitz	
121-100-06	4684 County Road 302 Willows, CA, 95988	R & R Mudd	4684 County Road 302 Willows, CA, 95988
021-100-08	4684 County Road 302 Willows, CA, 95988	R & R Mudd	4684 County Road 302 Willows, CA, 95988
021-100-09	4684 County Road 302 Willows, CA, 95988	R & R Mudd	4684 County Road 302 Willows, CA, 95988
021-100-12		George P. Knight Enterprises	
018-080-03		George P. Knight Enterprises	
018-110-17		G & K Baker	

BLOCK 25 – LIST OF OTHER CERTIFICATIONS OR APPROVALS/DENIALS RECEIVED FROM OTHER FEDERAL, STATE, OR LOCAL AGENCIES FOR WORK DESCRIBED IN THIS APPLICATION.

AGENCY	TYPE APPROVAL	ID NO.	APPLICANT	DATE APPLIED	DATE APPROVED
CALIFORNIA DEPARTMENT OF FISH & GAME	Section 1602 Lake or Streambed Alteration Permit	Pending	CBDD	Apr. 2007	Pending
CENTRAL VALLEY WATER QUALITY CONTROL BOARD	401 Water Quality Certification	Pending	CBDD	Apr. 2007	Pending
STATE WATER RESOURCES CONTROL BOARD	NOI for General Stormwater Permit	Pending	CBDD	Pending	Pending
COLUSA BASIN DRAINAGE DISTRICT	CEQA: EIR/NOD	SCH# 2002102125	CBDD	July 15, 2003 (EIR)	Dec. 16, 2004 (NOD)

REFERENCES

Gallaway Consulting Inc. 2002. *Biological Resources Assessment for the South Fork Willow Creek Detention Basin as Proposed by The Colusa Basin Drainage District*.

CH2M HILL. 2002. *Colusa Basin Drainage District Integrated Watershed Management Plan Alternatives Report*. Colusa Basin Drainage District.

CH2M HILL. 2003. *Integrated Watershed Management Plan Draft Environmental Impact Report*. Colusa Basin Drainage District.

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CH2M HILL. 2007. *Findings Report for 60% Submittal: South Fork Willow Creek Detention Basin*. Colusa Basin Drainage District.

PMC. 2007. *Delineation of Waters of the United States for the South Fork Willow Creek Detention Basin Project.* Colusa Basin Drainage District.